

REMARKS

Entry of the amendments is respectfully requested. Claims 1-29 are pending in the application. Claims 1-22 and 25 have been amended. Favorable reconsideration and allowance of this application is respectfully requested in light of the amendments and the foregoing remarks.

1. Allowable Subject Matter

The Applicants wish to thank the Examiner for indicating allowable subject matter of the invention. The Examiner indicated that claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant has amended claim 17 to include all of the limitations of base claim 1 and any intervening claims. Accordingly, allowance of claim 17 is respectfully requested.

2. Technical Amendments

The claims have been amended somewhat extensively, without altering their scope, to place them into better conformance with preferred USPTO practice and to more consistently refer to the properties of “each cooling element” and “each heat-conducting element” as opposed to “the cooling element” and “the heat-conducting element.” Additional amendments to the terminal clause of each of claims 1 and 22 are discussed in more detail below.

3. Rejections Based on the Prior Art

a. Recapitulation of the Invention¹

The invention relates to an electric heating device that is suitable for use in the supplemental electric heating of a motor vehicle. It is known to use electric heaters in the heating of the interior and/or the motor of motor vehicles. The control units associated with the electric heaters include power electronic components that are known to generate heat. The change of providing a two-part cooling element mounted to a circuit board of the control unit influences the dissipation of this generated heat, as well as simplifies the manufacturing process of the heater. In accordance with a preferred embodiment of the invention, the electric heating device includes several cooling elements, each of which is connected through an opening in a printed circuit board to a respective power transistor. Each cooling element is formed of two parts: a cooling body and a heat-conducting element insertable into the opening of the printed circuit board. The heat-conducting element is shaped so that it can be mechanically fixed in the opening in the printed circuit board. By mechanically fixing the heat-conducting element in the opening, mechanical forces stemming from the cooling element cannot affect the power transistor. These mechanical forces instead are received by the heat-conducting element and introduced to the circuit board. The power transistor thus is freed from any mechanical forces

¹ This Section 3a is intended to provide the Examiner with some background information on the state of the art and applicants' contribution to it. It is *not* intended to distinguish specific claims from the prior art. That task is performed in Section 3b below.

introduced from the cooling element, and the electric contacts of the power transistor are consequently prevented from being damaged.

b. Rejections under 35 U.S.C. § 103(a)

Claims 1 and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the U.S. Patent Appl. No. 2001/0013512 to Eisenhardt et al. (the Eisenhardt reference) in further view of U.S. Patent Appl. No. 2001/0050843 to Ueno et al. (the Ueno reference). The Applicants respectfully traverse these rejections because, as is discussed below, the references fail to disclose or suggest the subject matter of the claimed invention. Therefore, reconsideration is in order and is respectfully requested.

Claim 1 as amended recites an electric heating device that includes a heater block and a control unit for controlling several heating elements. The heater block forms one structural unit with the control unit. The control unit exhibits power transistors arranged on a printed circuit board and cooling elements allocated to these power transistors. Each cooling element is connected through an opening in the printed circuit board to the respective power transistor. The cooling element is formed from a cooling body and a heat-conducting element that inserts into the opening of the printed circuit board. Each heat-conducting element is mechanically fixed in the opening in the circuit board.

None of the cited references disclose a cooling element having a heat-conducting element that has a shape for mechanically fixing the heat-conducting element in an opening in a circuit board of a control unit for an electric heating device.

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The Examiner acknowledges that the Eisenhardt reference does not discuss the structure of a cooling body (See page 2 of Office Action dated September 21, 2004). To correct this deficiency, the Examiner cites to the Ueno reference. However, the Ueno reference does not disclose or suggest a heat-conducting element that is mechanically fixed in an opening of a printed circuit board. Rather, the Ueno reference discloses fixing a radiator 40 to a printed circuit board 3 by means of a silicon grease layer 20 and/or a Mylar tape 10 (*See paragraph 5; paragraph 21; and Figs. 1-3*). It therefore cannot prevent mechanical forces from being transferred to the transistors as efficiently as the inventive device. A review of the remaining cited references fails to disclose or suggest this subject matter as recited in amended claim 1. Therefore, the cited references do not disclose or suggest each and every limitation of the subject matter of the claimed invention. Accordingly, reconsideration and allowance of amended claim 1 is respectfully requested.

Dependent claims 2-16 and 18-21 are believed to be in condition for allowance for incorporating by reference the limitations of amended claim 1 and for defining additional features of the invention, which, when considered in combination with those of claim 1, are not disclosed by the prior art relied upon in the rejection.

Claim 22 is amended to recite an electric heating device that includes a cooling element having a heat-conducting element with a shape for mechanically fixing the heat-conducting element in an opening in a printed circuit board of a control unit. For reasons similar to those described above for claim 1, none of the cited references disclose or suggest this subject matter

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of the claimed invention. Accordingly, reconsideration and allowance of claim 22 is respectfully requested.

Dependent claims 23-29 are believed to be in condition for allowance for incorporating by reference the limitations of claim 22 and for defining additional features of the invention, which, when considered in combination with those of claim 22, are not disclosed by the prior art relied upon in the rejection.

CONCLUSION

It is submitted that claims 1-29 as amended are in compliance with 35 U.S.C. § 103 and each defines patentable subject matter. A Notice of Allowance is therefore respectfully requested.

No fee is believed to be payable with this communication. Nevertheless, should the Examiner consider any other fees to be payable in conjunction with this or any future communication, the Director is authorized to direct payment of such fees, or credit any overpayment to Deposit Account No. 50-1170.

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The Examiner is invited to contact the undersigned by telephone if it would help expedite matters.

Respectfully submitted,



Timothy E. Newholm
Registration No. 34,400

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Customer Account No.: 23598

BOYLE FREDRICKSON NEWHOLM
STEIN & GRATZ, S.C.
250 Plaza, Suite 1030
150 East Wisconsin Avenue
Milwaukee, WI 53202
Telephone: (414) 225-9755
Facsimile: (414) 225-9753
Attorney Docket No.: 127.015